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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,582	06/26/2006	Soon-yong Park	29137.098.00	3000
30827 7590 01/09/2008 MCKENNA LONG & ALDRIDGE LLP 1900 K STREET, NW WASHINGTON, DC 20006			EXAMINER JACKSON, MONIQUE R	
			ART UNIT 1794	PAPER NUMBER
			MAIL DATE 01/09/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,582	Applicant(s) PARK ET AL.	
	Examiner Monique R. Jackson	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/05</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because the units for thermal expansion coefficient comprises a typographical error. Correction is required. See MPEP § 608.01(b).
2. The disclosure is objected to because of the following informalities:

The monomers listed in paragraphs 0097, 0099, and 0105 are misspelled.

Appropriate correction is required.

Claim Objections

3. Claims 2, 4, 10, 13, and 15 are objected to because of the following informalities: the claims include an extra period prior to "the following formula". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 8-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 8 recites the limitation "a resin layer of a polyimide between the metallic layer at one side and a resin layer of a low expansion polyimide for improving adhesion with a metal" however it is unclear whether the limitation is referring to the polyimide intermediate layer and the metallic layers already claimed, or some other layer. Claim 11 is unclear for similar reasons wherein it is also noted that Claim 11 recites the limitation "wherein the polyimide for improving adhesion", which lacks proper antecedent basis in the claim.

6. Claims 18-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 18 recites the limitation "the precursor applied on the metal film at one side is a precursor of polyimide for improving adhesion with a metal, precursor of a low thermal expansion polyimide... and a precursor of a thermoplastic polyimide." However, the term "the precursor" lacks clear antecedent basis given that the parent claim includes two precursor solutions. Hence, it is unclear from the limitation whether the different precursors listed are alternatives. Further, Claims 19-21 recited the limitation "the precursor of a polyimide for improving adhesion with a metal" however the limitation lacks antecedent basis in these claims given that they depend upon Claim 12 not Claim 18.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0 496 334 A1 (EP'334.) EP'334 teaches a flexible metal/polyimide laminate comprising metal foil layers on both sides of a polyimide film wherein the polyimide film comprises a first polyimide layer of low thermal expansion of about 0.1×10^{-5} to $2.0 \times 10^{-5}/^{\circ}\text{C}$, and a second thermoplastic polyimide layer having a T_g of about 250 to 400 $^{\circ}\text{C}$; wherein the first polyimide is formed from a polyimide precursor solution utilizing diamine and dianhydrides disclosed at pages 3-5 and admixtures thereof, which read upon the claimed structures, with preferred monomers listed at

Page 7, lines 48-52, wherein the laminate is formed by a method as instantly claimed including sequentially applying precursors solutions to a first metal foil, drying and curing, and laminating a second metal foil (Abstract; Page 2, lines 36-58; Pages 3-5; Examples.) EP'334 teach that the metal foil(s) may be copper and can be subjected to a chemical or mechanical surface treatment to improve adhesion (Page 8.)

9. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kanakarajan et al (USPN 5,298,331.) Kanakarajan et al teach a flexible multilayer polyimide metal-clad laminate and preparation thereof wherein the laminate has at least one layer of aromatic polyimide bonded to at least one layer of a metallic substrate using a copolyimide adhesive layer containing repeating imide units derived from 4,4'-oxydiphtalic dianhydride and an aromatic ether diamine (Abstract.) The laminate comprises a base polyimide film that can be obtained from polyamic acid precursors derived from the reaction of suitable diamines with suitable dianhydrides wherein preferred dianhydrides include pyromellitic dianhydride and preferred diamines include p-phenylenediamine and 4,4'-diaminodiphenyl ether (Col. 2, lines 63-Col. 3.) The copolyimide layer is formed from a second polyamic acid precursor solution wherein the dianhydride component may further comprise pyromellitic dianhydride, phenylene bis(trimellitate)dianhydride, 3,3',4,4'-biphenyl tetracarboxylic dianhydride, or 3,3',4',4'-benzophenone tetracarboxylic dianhydride; and the diamine component may also comprise 4,4'-diaminodiphenyl ether (Col. 5.) Kanakarajan et al teach that the multilayer polyimide laminate can be formed by coating the copolyimide solution onto a gel film or green film of the polyimide base film formed by casting and drying the first precursor solution to produce a self-supporting film (Col. 6, lines 39-Col. 7, line 37.) The second polyimide solution or copolyimide

solution may be coated onto the gel or green film by dipping or roll coating and then the coated polyimide base film is heated to cure both polyimide layers (Col. 6-7.) Kanakarajan et al further teach that a metal-clad laminate can be formed by laminating a metal foil or metallic substrate directly onto the copolyimide layer, wherein particularly preferred metallic substrates are foils of rolled, annealed or electrodeposited copper or rolled, annealed copper alloy (Col. 8, lines 13-26.) Kanakarajan et al teach that the metallic substrate may be pretreated to improve adhesion to the polyimide film such as by chemical treatment or mechanical roughening wherein chemical treatment can form a metal oxide layer on the surface of the metallic substrate and also teach the use of brass-treated copper foils in the examples (reads upon instantly claimed metal layer A1 and metal layer A2.) With respect to the claimed Tg and coefficient of thermal expansion, the Examiner takes the position that the polyimide layers taught by Kanakarajan et al would inherently possess the claimed coefficient of linear expansion and Tg, particularly given that the layers are formed by the same monomers as in the instant invention.

10. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et al (USPN 4,937,133.) Watanabe et al teaches a double-sided metal/polyimide laminate comprising a low thermal expansion polyimide, a high thermal expansion polyimide with a Tg of 350°C or less, and a conductor such as copper wherein the low thermal expansion polyimide has a coefficient of linear expansion of $(0-19) \times 10^{-6}/K$ and are formed from dianhydrides and diamines, and mixtures thereof, that that read upon the claimed structures (Abstract; Col. 2-4; Col. 6, lines 37-43; Examples.) Watanabe et al further teach that an additional high thermal expansion polyimide layer may be provided between the other side of the low thermal expansion core layer and the second copper layer (Col. 6) and that the laminate can be formed by a process as

instantly claimed wherein the precursors solutions are sequentially or simultaneously applied to the first metal foil, then subjected to heat treatment, and heat pressing with a second metal foil or by adhering two coated metal foils resin to resin (Col. 7.)

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of copending Application No.

11229851. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one having ordinary skill in the art to provide a second copper foil on the surface of the laminate to produce a double-clad laminate and further to adjust to monomer content of the polyimide precursors to obtain a desired glass transition temperature for desired adhesive and/or heat resistance properties.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique R. Jackson whose telephone number is 571-272-1508. The examiner can normally be reached on Mondays-Thursdays, 10:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Monique R. Jackson
Primary Examiner
Technology Center 1700
January 6, 2008